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Approach for Conducting the Evaluation of the Conservation Strategy Options

The SAIC team will conduct a comparative evaluation of the four Conservation Strategy (CS) Options to assess their relative potential to meet the 17 biological, planning, flexibility/durability/sustainability, and other resource impact criteria. Key outcomes of the evaluation of each criteria category will be to provide the BDCP Steering Committee with information related to:

Biological Criteria: the ability of each Option configuration to address the near-term and long-term conservation needs of the covered fish species relative to current conditions and to each of the other Options.

Planning Criteria: the relative ability of each Option achieve water supply objectives, the relative feasibility for implementing each Option, the range of Option implementation costs, and the relative cost effectiveness of each Option for providing biological and water supply benefits.

Flexibility/Durability/Sustainability Criteria: the relative ability of each Option to address uncertainties and to provide long-term flexibility in adjusting management of the Delta in the future to meet long-term conservation needs of the species based on new information collected over the term of the BDCP, provide long-term flexibility for achieving water supply objectives, and to withstand possible effects of future environmental change (e.g., effects of climate change on sea level rise and Delta hydrology) and catastrophic events (e.g., seismic events, large scale levee failures).

Other Resource Impacts Criteria: the range and relative magnitude of impacts of implementing each of the Options on other biological resources (i.e., biological resources not currently addressed by the BDCP) and the human environment.

The product of this evaluation is intended to provide a level of information sufficient to help guide the Steering Committee toward selection of a final set of strategies to be incorporated into the Conservation Strategies Framework, which will serve as the basis for development of the details necessary to prepare the Bay Delta Conservation Plan.

The evaluation will be conducted using a number of tools appropriate for evaluating the performance of each Option under each criteria including:

- species stressors importance tables,
- DRERIP and DRMS conceptual species and ecosystem process models,
- findings of relevant studies and monitoring reported in literature,

- results of studies of similar Option configurations evaluated under previous programs (e.g., CALFED),
- results of coarse hydrodynamic modeling conducted for each of the Options, and
- expert opinion and best professional judgment.

The CS Options evaluation report will use the most recent research and monitoring results and will include citations for all conclusions stated; however, given the significant knowledge gaps regarding the covered species, the evaluation will be largely qualitative and based on best professional judgment of the SAIC team with input from recognized species experts. The evaluation will include an assessment of the important stressors on covered species and the compatibility of each Option to address a range of potential conservation actions. The SAIC team will apply coarse hydrodynamic models using an assumed range of settings for operational parameters to provide a comparative basis from which to evaluate the relative ability of the Options to meet the evaluative criteria. An important component of the evaluation will be an assessment of the flexibility of each option to respond to current and future uncertainties and to adapt over time to the growing knowledge of the Bay-Delta's complex ecological and hydraulic conditions.

Evaluation of CS Options

The approach to evaluating the four CS Options against the 17 evaluation criteria in each of the four criteria categories is discussed below.

Biological Criteria

- SAIC will identify and rank the relative importance of key stressors for each of the fish species at the population level. Stressors and stressor rankings will be based on literature, expert opinion, and other appropriate sources. Research literature and other sources of information used to develop the stressor ranking conclusions will be cited per recommendations provided by Denise Reed, BDCP Lead Scientist.
- Based on the cause and effect linkages from the DRERIP and DRMS conceptual models, correlative relationships identified in the literature, results of relevant studies, and expert professional judgment, each biological criterion will be assessed and conclusions drawn indicating the anticipated effects on fish populations of each CS Option.
- Using the DRERIP and DRMS species models, relevant literature, and expert opinion in conjunction with hydrologic modeling outputs (see more detailed discussion below), SAIC will determine which important stressors could be affected under the four CS Options. This largely qualitative assessment will include descriptions of the probable cause and effect linkages relevant to the

environmental parameters addressed in the criteria and will be based on literature, expert opinion, and other appropriate sources that will be cited in the text. This assessment is anticipated to be based primarily on the DRERIP conceptual models and models developed for the DRMS fish assessments. SAIC will use the DRERIP conceptual models and other information to assess the expected magnitude of biological effects.

- The SAIC team will also identify other important stressors for which non-flow-related conservation measures would need to be implemented to fully address the draft BDCP biological objectives (which are addressed by the first six biological criteria) for each of the species. Examples of these types of stressors include effects of non-native predators/competitors, harvest, toxic events, and the extent and quality of physical habitat. This assessment will be made using published literature, discussions with species experts, information supporting the DRERIP conceptual models, and best professional judgment. SAIC will provide an assessment of the ability of each Option to accommodate implementation of these measures within the Delta and will identify the important species stressors that are independent of the Option configurations and can only be addressed through measures implemented outside of the Delta. For example, SAIC will compare the potential extent of physical habitat restoration under each CS Option that would be expected to provide substantial benefits to covered species based on the DRERIP models, habitat suitability indices previously used by DRMS, relevant literature, and expert opinion. The extent and location of potential physical habitat restoration will be based on such factors as elevation (i.e. degree of subsidence), proposed conveyance infrastructure and its affects on surrounding habitat, and anticipated use by fish species.
- In addition to the comparative evaluation, the relative biological performance of each CS Option for each biological criterion will be “benchmarked” against existing Delta conditions to provide the Steering Committee with an understanding of the relative magnitude of outcomes anticipated for each species. SAIC will develop an appropriate tool for consistently scaling the evaluation results to provide for valid comparison of the outcomes among the CS Options under a range of flow scenarios. This benchmarking and scaling approach responds to the recommendations of Denise Reed.

Planning Criteria

- The SAIC team will assess the ability of each CS Option to achieve the water supply goals based on outputs from the hydrodynamic modeling (see below) relative to export objectives.
- The feasibility and costs for implementing each option will be based primarily on assessments of feasibility and cost assessments prepared for similar options evaluated for other programs (e.g., CALFED, DRMS). As needed, SAIC will

Flexibility/Durability/Sustainability Criteria

- Flexibility, durability, and sustainability of each CS Option will be assessed qualitatively using available information, including information on similar options addressed in prior studies. Information developed by DRMS will be used to assess possible effects for future large scale changes that may be associated with climate change, seismic events, etc. As needed, SAIC will contact water engineering experts to obtain additional information regarding the performance of each Option relative to these criteria. The relative durability of the CS Options will be assessed based on the anticipated improvement of ecosystem processes that support the long term needs of each of the covered species and their habitats with minimal future input of resources. An important outcome of the assessment will be an evaluation of the ability of each Option to provide the management flexibility to address current uncertainty and the future conservation needs of species that may be identified through new information or result from future changes in environmental conditions (e.g., climate change).

Other Resource Impacts Criteria

- Potential affects of each CS Option on other biological resources (not targeted by the BDCP at this time) and on the human environment will be assessed qualitatively using available information, including assessments on similar options for prior studies (e.g. CALFED EIR/S). Because the exact alignments of each Option is not identified, assumptions regarding the location and dimensions of the infrastructure associated with each Option will be identified based on the best available information. The assessment of other resource impacts will be based on the likely impacts to other resources as present under current conditions. Results of this assessment will identify the range of relative impacts of each Option on other biological resources and the human environment.

Hydrologic Modeling

Hydrologic and hydrodynamic modeling will be conducted to assess the relative potential of the four CS Options to address the evaluation criteria related to operations (especially

criterion #2 regarding the enhancement of flow and water quality for fish and criterion #8 regarding the achievement of water supply goals). This modeling task requires a significant effort, however, it represents only one tool in the evaluation of how the CS Options perform in meeting the 17 evaluation criteria. Because of the complexity of this task, more detail is provided here to help the reader understand how it will be conducted and its value and limitations.

Hydrologic modeling will be conducted using CALSIM II and DSM2 models. Operational settings for flow parameters to be used in the coarse modeling will be those values approved by the Steering Committee on July 18, 2007 for below-normal-year conditions. The flow parameter values will be expanded to reflect a range of water-year type hydrologic conditions based on a standardized approach. The hydrologic model run for existing Delta conditions that will be used as part of the foundation for the evaluation assumes present conditions (current year demands and facilities) and existing regulatory constraints as outlined in D-1641 and the USFWS and NMFS biological opinions.

A basic overview of the modeling proposed to be used as part of this evaluation is described below. The evaluation approach involves three types of analyses:

- (1) Hydrologic analyses of delta flows and export operations including frequency of exceedance analyses (based on annual conditions under each option as well as for specific biologically sensitive seasonal periods) and other graphic and tabular displays of:
 - Reservoir storage
 - Sacramento River flow at Hood
 - Sacramento River flow at Rio Vista
 - San Joaquin River flow at Vernalis
 - QWEST (direction and magnitude)
 - Old and Middle river flows (direction and magnitude)
 - SWP and CVP exports
 - X2 location
 - Delta inflow
 - Delta outflow
- (2) Particle tracking analyses to assess the potential fate of neutrally buoyant particles (simulating planktonic fish eggs/larvae, zooplankton, and phytoplankton) including:
 - particle injection points (100 particles per injection) in Old River, Middle River, lower San Joaquin River near Big Break, Sacramento River near Cache Slough, and San Joaquin River near the Head of Old River, and
 - particle location and fate would be monitored over a 28-day period (a 7-day intervals) at the SWP and CVP export facilities, exiting into Suisun Bay, and remaining within the Delta.

- (3) Estimates of the difference in fish entrainment/salvage assuming various export operations and fish screening technologies.

The comparative assessment of various conservation strategy options for water conveyance will be analyzed across conveyance configuration options as shown below (with “a” and “b” representing the different flow scenarios based on differing parameter input values):

Current Base	Option 1a	Option 2a	Option 3a	Option 4a
Current Base	Option 1b	Option 2b	Option 3b	Option 4b

The performance of each conveyance configuration option will be evaluated: (1) between an option and the current base conditions and (2) across the options.

Report Delivery and Presentation

- SAIC anticipates distributing the draft CS Options Evaluation Report as an Adobe pdf file to the Steering Committee for review via SAIC’s FTP site on August 31, 2007.
- SAIC will present the evaluation results to the Steering Committee for discussion at the September 7, 2007 meeting.

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